

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 18 of 24 pages

Portability domain boundaries:

- AT&T Tends toward state delimited, flexible
- MCI Tends toward state delimited, though constrained by implications of carrier portability code construction with availability of "unused" NPAs. Smaller domains may be needed in some areas.
- GTE National
- USIN Tends toward sub-state regions
- Sum. AT&T appears to be the most flexible.

Number management agencies:

- All plans concur that number management should be handled through a "neutral entity". All except GTE indicate that multiple, regional neutral entities should be deployed.
- Sum. The quantity of neutral entities must be tailored to the plan being implemented.

SS#7 deployment implications:

- AT&T Development of new SS#7 data structures for portability needed, recognizes that CMRS will require special attention.
- MCI Minimal development of new SS#7 structures, recognizes that CMRS will require special attention. Acknowledges that its proposal may be interim measure awaiting full development of AT&T plan.
- GTE Need new national database for N00 service codes. CMRS not specifically recognized.
- USIN No new SS#7 development. CMRS and CLASS feature and routing interaction potential recognized.
- Sum. All plans except GTE use customer POTS numbers. GTE proposes a one-time change of customer number to an N00 SAC number, evaluated as a negative.  
AT&T plan requires most development. Other plans require development of roughly the same order of magnitude

CMRS Type 2B trunking limitations:

- AT&T, MCI, USIN Plans incompatible with Type 2B trunking without SSP capability in CMRS switching machine or use of external SSP-tandem function.
- GTE No immediate limitation noted provided that all portability-SAC destined traffic could be routed through an SSP capable access tandem.

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 19 of 24 pages

Sum. Type 2B trunking incompatibilities render all except GTE plan unsuitable for immediate or interim "industry-wide" portability implementation. Revision of network structure and CMRS switch capabilities needed especially in inter-local environment.

CMRS Type 1 trunking considerations:

All plans have equal benefits and difficulties.

CLASS functions and derivatives, considerations:

All plans present similar concerns with interfacing to existing ANI and Caller ID based systems.

Sum. System data and operational definitions needed for the era of portability

9-1-1 and E-9-1-1 services:

All plans are subject to CLASS definition arrangements for POTS customers. CMRS identities are a matter entirely independent of CLASS or ANI. Vehicle location reporting technology development required.

Sum. Development of 9-1-1/E-9-1-1 CMRS standards needed.

Determination of charges for calls:

All proposals require full ten (10) digit analysis for determination of toll or local jurisdiction, and specific toll or local message/measured rate to be applied.

Sum. Standardization and development of efficient ten (10) digit translation mechanism to address multiple carriers using differing charging structures.

Customer dialing patterns:

AT&T, MCI Almost certain evolution to ten (10) digit dialing and NPA overlays within portability domains become prevalent.

GTE Ten (10) digit dialing of "portability SAC" necessary, no seven (7) digit local calls to portable numbers.

USIN As "islands of portability" embrace multiple NPAs, ten (10) digit dialing will become necessary

Sum. AT&T plan causes the least pressure upon local seven (7) digit dialing due to better number resource use efficiency.

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 20 of 24 pages

**Number conservation and area code relief:**

AT&T Personal address NANP-derived, completely independent from physical address. Can readily port formerly dedicated but unused rural numbers to relieve code exhaust within portability domain.

MCI Seen as an interim measure to full development of AT&T LRN plan. Requires use of unused area codes as carrier portability "pseudo NPAs". May result in premature constraint of portable number availability or temporary exhaust of NPA resources.

GTE Utilizes two NANP numbers, its N00 portability number as a personal address and a conventional NANP geographic network number as the physical address. Inefficient.

USIN Utilizes two NANP numbers, a conventional NANP geographic network number as the personal address, and another as the physical address. Very inefficient.

Sum. AT&T provides potential for greatest number and area code conservation.

**Conclusion:**

AT&T's plan, though more complex, appears to provide the most comprehensive, favorable and flexible platform for long term number portability in the exchange service provider industry, inclusive of CMRS and LEC participants.

**Interim portability requirements:**

Several factors militate for implementing an interim number portability plan. Several other factors militate for the interim plan to be limited to LECs. Included among the factors are local and federally sponsored competitive pressures and knowledge that development of an economically and technically viable plan is going to require many months if not several years to perfect and deploy. It has also been recognized that any interim plan must represent a "reasonable" investment by providing an economically sound stepping stone or building block to an ultimate solution. That interim step can take the form of either short term installation of equipment which will be replaced and scrapped at the end of the interim period, or modular additions to or construction of equipments which can continue to be used within the ultimate solution.

At the same time, any interim number portability solution must be reasonable for all participants in the local exchange service provider industry, and must not seriously disadvantage any member.

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 21 of 24 pages

There are several "interim" number portability plans currently in operation. These are all variants of network based RCF (remote call forwarding) and its dedicated-trunk based cousin, "Flex"-DID, and are all limited to LEC -to- LEC portability. Each of these plans translates one network address, the "ported" number, into a second network address, the "destination number" and forwards/re-directs a call through the ported number's serving switch, or a closely related tandem, to the destination number switching entity. Such arrangements at least double local network facility usage, double NANP number consumption, and usually impair both CLASS functionality and transmission quality. These RCF-derived interim LEC portability arrangements do not, however, in any adverse manner affect CMRS operations.

Use of any of the four long-term plans discussed in this document as an/the interim portability arrangement, does immediately and adversely affect CMRS exchange service providers unless very careful attention is given to coordinating and isolating the lesser capabilities of most of the installed, and relatively new, CMRS switching equipment base with respect to introduction of interim number portability from an incumbent LEC switching entity. The AT&T, MCI, and USIN system constraints imposed upon ongoing CMRS Type 2B trunking compatibility,<sup>18</sup> which require either immediate equipage of SS#7 capability in the CMRS end office for translating direct-routed inter-local calling to interim portable numbers, or rerouting those calls via another entity's "bottleneck" SSP tandem, would appear to diminish the suitability of any of those plans for the interim solution. The GTE plan, by requiring an initial telephone number change, and creation of new N00 SAC number management and database services would appear to diminish that plan's suitability to the growing C-LEC industry. One is therefore left to fall back on temporary RCF based solutions which, while cumbersome and less than technically perfect, can continue to serve without requiring building of semi-recoverable/salvageable interim plant facilities and short term uniquely trained staff by both the incumbent LECs and CMRS providers.

Number portability between the PSTN and CMRS providers and within the CMRS industry has already received relevant consideration. To date, with the exception of cellular to cellular "local" service provider porting, cellular providers have received few "portability" requests. Conversely, automatic and manually activated cellular "follow-me" roaming today offer a form of enhanced flex-DID porting on a user commanded, temporary portability basis. Purely conventional call forwarding is also available in cellular switches, but as a number portability mechanism is normally not directly compatible with the interim LEC arrangements. Due to presently overwhelming

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<sup>18</sup> The constraints imposed upon Type 2B CMRS trunks also apply to direct inter-end-office trunking to/from non-SS#7 equipped LEC switching entities.

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 22 of 24 pages

fraudulent use of cellular facilities, porting numbers to or from CMRS systems must be approached with extreme caution.

CMRS paging service providers have received very few requests for location based number portability, but occasionally experience inquiries for local service provider number portability. Unlike cellular switches, paging end office switches normally interconnect with PSTN utilizing only unidirectional, inward trunking, and are not equipped with consumer useable, general call forwarding features. CMRS paging systems normally originate no outbound calls. This situation effectively prevents paging service provider participation in any of the end-office-based RCF or flex-DID interim local number portability arrangements. Personal address -to- physical address -to- paging equipment address correlation, while necessarily different under portability from current practice, appears to have straight-forward adaptability, within reasonable limits, to a variety of addressing arrangements.

Accordingly, inclusion of CMRS exchange service providers in an interim portability plan, or endorsement of efforts to "perfect" any particular interim number portability plan, except to the extent that adverse effects upon CMRS operations are avoided cannot, in good conscience, be recommended.

While the CMRS industry generally recognizes the benefits of upgrading its switching equipment for full SS#7 interoperability, such investment is wisely deferred until CMRS-SS#7 and number portability standards are solidified. Successful customer growth in the long-competitive CMRS marketplace does not support a push for immediate availability of CMRS number portability. It is therefore suggested that CMRS exchange service providers not participate in interim number portability.

**Long term number portability plan:**

Of the Comments offered, the AT&T proposal, also called "LRN" (Location Routing Number), appears to be the most technically balanced and technically reasonable of the lot. This statement should not, however, be construed as an unconditional endorsement of the AT&T/LRN proposal. Particularly with respect to CMRS providers, there are some shortcomings.

LRN retains the affirmative fundamentals of the six-digit translation philosophy upon which the structure of the domestic and "North American" network is premised. Conversely, LRN acknowledges that to be able to effect any degree of NANP number conservation while embracing sensibly large domains of portability, personal addresses will become different and dissociated from physical addresses. It also provides for variations in the size and content of portability domains, thus accommodating

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 23 of 24 pages

customizing of location portability service offerings, and appears to be capable of functioning in an exchange service provider environment comprising both entities participating and not participating in number portability.

LRN affords essentially ubiquitous number portability, which in turn appears to offer a number of competitive opportunities additional to choice of exchange service providers and location flexibility for one's personal address. There are significant opportunities for SS#7 SCP (signaling control point) operators providing personal address/physical address correlation data bases, including databases coupled with dynamic single number calling products. Quasi-competitive SCPs are anticipated within larger portability domains. Competitive access tandem services is another venue open to competition. As exchange level competition heats up, many of the facilities based and/or switch-based competitors will find it beneficial to utilize direct, competitive access tandem interconnection with competitive IXC's as well as with competitive exchange service providers. While a portability domain provides one configuration of the scope of a competitive access tandem, only creativity and economics form the upper limit.

CMRS participation in LRN, or for that matter any long term portability arrangement, will require significant research, analysis, development, deployment, and administration. It will also, again with respect to any standard, require substantial re-configuration of CMRS-PSTN interconnection and traffic interchange arrangements.

The MCI "CPC" (carrier portability code) plan is considered approximately equal to AT&T's LRN except for the potential for limitation of ability to handle multiple exchange service providers serving multiple area codes within the same portability domain. The use of "residual" numbering resources for local area physical address emulation was also evaluated to be less than optimal, and could suffer from premature exhaustion in high density areas.

GTE's plan, while certainly operable, contradicts one of the basic tenets of this number portability proceeding, that being that a customer, through number portability, can retain his present telephone number, when, at some indeterminate time in the future, he may choose to change service providers.

The USIN plan and "Seattle Trial" demonstrate the efficacy of dissociated personal addresses and physical addresses in providing number portability. However, the "cost" of portability in the USIN plan is high, being consumption of two NANP telephone numbers for each ported user.

**TECHNICAL MEMORANDUM**

Telephone Number Portability, Overview of Issues

10 October 1995 - Page 24 of 24 pages

**General observations:**

The following considerations are important in evaluating any telephone number portability plan. The plan must be economically, technically, and operationally sound. Service provider number portability should, and location portability may be part of any permanent plan. Any interim plan should, at a minimum provide service provider portability, and should not adversely affect incumbent exchange service providers. It may be reasonable to exclude certain classes of exchange service providers from requirements to provide interim number portability and possibly even long term portability. Portability of numbers between dissimilar services will likely result in confusion, not competition. In any long term plan, numbers should be location-portable only within well-defined, administratively, demographically, jurisdictionally, geographically, commercially separable areas. These domains of portability should not be so large as to encourage disparity of regulation within the domain, but not so small as to render portability meaningless. While there are a number of rational exceptions, state boundaries appear to be a reasonable choice for portability domains over the long term.

NANP numbers should be used for personal addresses, and should be completely isolated in function from physical addresses. A separate physical address regimen is appropriate, but need not be materially different from the NANP. Proper design of the physical address scheme, and correct choice of portability domains will significantly prolong the useful life and optimize capacity of the NANP code resource.

Inclusion of CMRS providers in interim portability measures is at best cumbersome and potentially costly, appears to serve no demonstrated need, and is not recommended. Integration of CMRS services within a long term, national standard number portability plan awaits definition by the regulators and industry of that standard and development of functionalities meeting that definition. CMRS roaming, fraud-control, and 9-1-1/E-9-1-1 compatibility may require special consideration in number portability.

**Summary / conclusions:**

In summation, the AT&T LRN plan appears suitable, with caveats, for long term number portability, for both LEC providers and CMRS providers. Interim LEC number portability must function without adversely affecting CMRS operations or CMRS-PSTN interworking. CMRS should be excluded from interim portability requirements. Much work remains to be accomplished to achieve a solid industry consensus on and standardization of the details for long term number portability.

Jan David Jubon, P. E.

10 October 1995

## **SERVICE LIST**

I, Yvette Omar, a secretary with the law firm of Bryan Cave LLP, hereby certify that a copy of the foregoing Joint Reply Comments of AirTouch Paging and Arch Communications Group was sent first class, postage prepaid, United States mail or hand-delivered on October 12, 1995, to the following:

Chairman Reed E. Hundt  
**STOP CODE 0101**  
Federal Communications Commission  
1919 M Street, N.W.  
Room 814  
Washington, D.C. 20554

Commissioner Andrew C. Barrett  
**STOP CODE 0103**  
Federal Communications Commission  
1919 M Street, N.W.  
Room 826  
Washington, D.C. 20554

Commissioner Susan Ness  
**STOP CODE 0104**  
Federal Communications Commission  
1919 M Street, N.W.  
Room 832  
Washington, D.C. 20554

Matt Harthun  
Policy and Programming Division  
Common Carrier Bureau  
Federal Communications Commission  
1919 M Street, N.W.  
Room 544  
Washington, D.C. 20554

International Transcription Services, Inc.  
(ITS, Inc.)  
2100 M Street, N.W.  
Suite 140  
Washington, D.C. 20037

Commissioner James H. Quello  
**STOP CODE 0106**  
Federal Communications Commission  
1919 M Street, N.W.  
Room 802  
Washington, D.C. 20554

Commissioner Rachelle B. Chong  
**STOP CODE 0105**  
Federal Communications Commission  
1919 M Street, N.W.  
Room 844  
Washington, D.C. 20554

Kathleen M.H. Wallman, Chief  
Common Carrier Bureau  
Federal Communications Commission  
1919 M Street, N.W.  
Room 500  
Washington, D.C. 20554

Janice Myles  
Policy and Programming Division  
Common Carrier Bureau  
Federal Communications Commission  
1919 M Street, N.W.  
Room 544  
Washington, D.C. 20554

Werner K. Hartenberger  
Counsel for The Ad Hoc Coalition  
of Competitive Carriers  
Dow, Lohnes & Albertson  
Suite 500  
1255 23rd Street, N.W.  
Washington, DC 20037



**Laura H. Phillips**  
Counsel for The Ad Hoc Coalition  
of Competitive Carriers  
Dow, Lohnes & Albertson  
Suite 500  
1255 23rd Street, N.W.  
Washington, DC 20037

**Charles H. Helein**  
Counsel for America's Carriers  
Telecommunication Association  
Helein & Associates, P.C.  
Suite 700  
8180 Greensboro Drive  
McLean, VA 22102

**Frank Michael Panek**  
Counsel for Ameritech  
Room 4H86  
2000 West Ameritech Center Drive  
Hoffman Estates, IL 60196-1025

**Richard J. Metzger**  
General Counsel  
Association for Local  
Telecommunications Services  
Suite 560  
1200 19th Street, N.W.  
Washington, DC 20036

**Mark C. Rosenblum**  
Counsel for AT&T Corp.  
Room 3244J1  
295 North Maple Avenue  
Basking Ridge, NJ 07920

**Clifford K. Williams**  
Counsel for AT&T Corp.  
Room 3244J1  
295 North Maple Avenue  
Basking Ridge, NJ 07920

**J.G. Harrington**  
Counsel for The Ad Hoc Coalition  
of Competitive Carriers  
Dow, Lohnes & Albertson  
Suite 500  
1255 23rd Street, N.W.  
Washington, DC 20037

**Larry A. Peck**  
Counsel for Ameritech  
Room 4H86  
2000 West Ameritech Center Drive  
Hoffman Estates, IL 60196-1025

**Mark Stachiw**  
AirTouch Paging  
Three Forest Plaza  
Suite 800  
12221 Merit Drive  
Dallas, TX 75251

**Robert M. Gurss**  
Counsel for Association of  
Public-Safety Communications  
Officials International, Inc.  
Wilkes, Artis, Hedrick & Lane,  
Chartered  
Suite 1100  
1666 K Street, N.W.  
Washington, DC 20006

**John J. Langhauser**  
Counsel for AT&T Corp.  
Room 3244J1  
295 North Maple Avenue  
Basking Ridge, NJ 07920

**Edward D. Young, III**  
Counsel for Bell Atlantic  
1320 N. Court House Road  
Arlington, VA 22201

**Michael E. Glover**  
Counsel for Bell Atlantic  
1320 N. Court House Road  
Arlington, VA 22201

**Betsy L. Anderson**  
Counsel for Bell Atlantic  
1320 N. Court House Road  
Arlington, VA 22201

**John T. Scott, III**  
Counsel for Bell Atlantic Nynex  
Mobile, Inc.  
Crowell & Moring  
1001 Pennsylvania Avenue, N.W.  
Washington, DC 20004-2595

**Jim O. Llewellyn**  
Counsel for BellSouth Corporation  
Suite 1800  
1155 Peachtree Street, N.E.  
Atlanta, GA 30309-3610

**Theodore R. Kingsley**  
Counsel for BellSouth  
Telecommunications, Inc.  
4300 Southern Bell Center  
675 West Peachtree Street  
Atlanta, GA 30375

**Jerry Yanowitz**  
California Cable Television  
Association  
4341 Piedmont Avenue  
Oakland, CA 94611

**Jennifer A. Johns**  
California Cable Television  
Association  
4341 Piedmont Avenue  
Oakland, CA 94611

**Randal S. Milch**  
Counsel for Bell Atlantic  
1320 N. Court House Road  
Arlington, VA 22201

**Duane K. Thompson**  
Counsel for Bell Atlantic  
1320 N. Court House Road  
Arlington, VA 22201

**William B. Barfield**  
Counsel for BellSouth Corporation  
Suite 1800  
1155 Peachtree Street, N.E.  
Atlanta, GA 30309-3610

**M. Robert Sutherland**  
Counsel for BellSouth  
Telecommunications, Inc.  
4300 Southern Bell Center  
675 West Peachtree Street  
Atlanta, GA 30375

**Alan J. Gardner**  
California Cable Television  
Association  
4341 Piedmont Avenue  
Oakland, CA 94611

**Jeffrey Sinsheimer**  
California Cable Television  
Association  
4341 Piedmont Avenue  
Oakland, CA 94611

**Dr. Francis R. Collins**  
Consultant to California Cable  
Television Association  
CCL Corporation  
Box 272  
Newton, MA 02159

**Donna N. Lampert**  
Counsel for California Cable  
Television Association  
Mintz, Levin, Cohn, Ferris,  
Glovsky and Popeo, P.C.  
Suite 900  
701 Pennsylvania Avenue, N.W.  
Washington, DC 20004

**Michael F. Altschul**  
Vice President and  
General Counsel  
Cellular Telecommunications  
Industry Association  
Suite 200  
1250 Connecticut Avenue, N.W.  
Washington, DC 20036

**Brenda K. Pennington**  
Staff Counsel  
Cellular Telecommunications  
Industry Association  
Suite 200  
1250 Connecticut Avenue, N.W.  
Washington, DC 20036

**Barry Pineles**  
Assistant Chief Counsel  
Office of Advocacy  
United States Small Business  
Administration  
Suite 7800  
409 Third Street, S.W.  
Washington, DC 20416

**Thomas E. Taylor**  
Counsel for Cincinnati Bell  
Telephone Company  
Frost & Jacobs  
2500 PNC Center  
201 East Fifth Street  
Cincinnati, OH 45202

**Christopher A. Holt**  
Counsel for California Cable  
Television Association  
Mintz, Levin, Cohn, Ferris,  
Glovsky and Popeo, P.C.  
Suite 900  
701 Pennsylvania Avenue, N.W.  
Washington, DC 20004

**Randall S. Coleman**  
Vice President, Regulatory  
Policy and Law  
Cellular Telecommunications  
Industry Association  
Suite 200  
1250 Connecticut Avenue, N.W.  
Washington, DC 20036

**Jere W. Glover**  
Chief Counsel  
Office of Advocacy  
United States Small Business  
Administration  
Suite 7800  
409 Third Street, S.W.  
Washington, DC 20416

**Peggy A. Peckham**  
Director - Legislative &  
Regulatory Planning  
Cincinnati Bell Telephone  
201 E. Fourth Street  
P.O. Box 2301  
Cincinnati, OH 45201-2301

**Christopher J. Wilson**  
Counsel for Cincinnati Bell  
Telephone Company  
Frost & Jacobs  
2500 PNC Center  
201 East Fifth Street  
Cincinnati, OH 45202

**Ellen S. Deutsch**  
**Counsel to Citizens**  
**Utilities Company**  
**Electric Lightwave, Inc.**  
**P.O. Box 4678**  
**Vancouver, WA 98662**

**Steven A. Augustino**  
**Counsel for The Competitive**  
**Telecommunications Association**  
**Wiley, Rein & Fielding**  
**1776 K Street, N.W.**  
**Washington, DC 20006**

**David L. Kahn**  
**c/o Bellatrix International**  
**Suite 415**  
**4055 Wilshire Boulevard**  
**Los Angeles, CA 90010**

**Cynthia B. Miller**  
**Associate General Counsel**  
**Florida Public Service Commission**  
**Room 301, Gerald L. Gunter Building**  
**2540 Shumard Oak Boulevard**  
**Tallahassee, FL 32399-0850**

**Emily C. Hewitt**  
**General Counsel**  
**General Services Administration**  
**Room 4002**  
**18th & F Streets, N.W.**  
**Washington, DC 20405**

**Jody B. Burton**  
**Assistant General Counsel**  
**General Services Administration**  
**Room 4002**  
**18th & F Streets, N.W.**  
**Washington, DC 20405**

**Danny E. Adams**  
**Counsel for The Competitive**  
**Telecommunications Association**  
**Wiley, Rein & Fielding**  
**1776 K Street, N.W.**  
**Washington, DC 20006**

**Genevieve Morelli**  
**Vice President and General Counsel**  
**The Competitive Telecommunications**  
**Association**  
**Suite 220**  
**1140 Connecticut Avenue, N.W.**  
**Washington, DC 20036**

**David C. Jatlow**  
**The Ericsson Corporation**  
**Young & Jatlow**  
**Suite 600**  
**2300 N Street, N.W.**  
**Washington, DC 20037**

**Kathy L. Shobert**  
**Counsel for General**  
**Communication, Inc.**  
**Director, Federal Affairs**  
**Suite 900**  
**901 15th Street, N.W.**  
**Washington, DC 20005**

**Vincent L. Crivella**  
**Associate General Counsel**  
**Personal Property Division**  
**General Services Administration**  
**Room 4002**  
**18th & F Streets, N.W.**  
**Washington, DC 20405**

**Michael J. Ettner**  
**Senior Assistant General Counsel**  
**Personal Property Division**  
**General Services Administration**  
**Room 4002**  
**18th & F Streets, N.W.**  
**Washington, DC 20405**

**John A. Malloy**  
Vice President and General Counsel  
GO Communications Corporation  
Suite 410  
201 N. Union Street  
Alexandria, VA 22314

**David J. Gudino**  
Counsel for GTE Service Corporation  
Suite 1200  
1850 M Street, N.W.  
Washington, DC 20036

**Harold L. Stoller**  
Counsel for Illinois Commerce  
Commission  
Special Assistant Attorney General  
527 East Capitol Avenue  
P.O. Box 19280  
Springfield, IL 62794-9280

**Edwin N. Lavergne**  
Counsel for Interactive  
Services Association  
Ginsburg, Feldman and Bress, Chartered  
1250 Connecticut Avenue, N.W.  
Washington, DC 20036

**Paul Glist**  
Counsel for Jones Intercable, Inc.  
Cole, Raywid & Braverman, L.L.P.  
Suite 200  
1919 Pennsylvania Avenue, N.W.  
Washington, DC 20006

**John C. Dodge**  
Counsel for Jones Intercable, Inc.  
Cole, Raywid & Braverman, L.L.P.  
Suite 200  
1919 Pennsylvania Avenue, N.W.  
Washington, DC 20006

**Leo R. Fitzsimon**  
Counsel for GO Communications  
Corporation  
Suite 410  
201 N. Union Street  
Alexandria, VA 22314

**Robert C. Schoonmaker**  
Vice President  
GVNW Inc./Management  
2270 La Montana Way  
Colorado Springs, CO 80918

**Richard S. Wolters**  
Counsel for Illinois Commerce  
Commission  
Special Assistant Attorney General  
527 East Capitol Avenue  
P.O. Box 19280  
Springfield, IL 62794-9280

**Darren L. Nunn**  
Counsel for Interactive  
Services Association  
Ginsburg, Feldman and Bress, Chartered  
1250 Connecticut Avenue, N.W.  
Washington, DC 20036

**Christopher W. Savage**  
Counsel for Jones Intercable, Inc.  
Cole, Raywid & Braverman, L.L.P.  
Suite 200  
1919 Pennsylvania Avenue, N.W.  
Washington, DC 20006

**Catherine R. Sloan**  
Counsel for Worldcom, Inc.  
d/b/a LDDS WorldCom  
Suite 400  
1120 Connecticut Avenue, N.W.  
Washington, DC 20036

**Richard L. Fruchterman**  
Counsel for Worldcom, Inc.  
d/b/a LDDS Worldcom  
Suite 400  
1120 Connecticut Avenue, N.W.  
Washington, DC 20036

**Richard F. Nelson, Chair**  
Florida 9-1-1 Coordinator Group  
Marion County  
Board of County Commissioners  
9-1-1 System Support Department  
2631 S.E. 3rd Street  
Ocala, FL 34471-9101

**Donald J. Elardo**  
Counsel for MCI Telecommunications  
Corporation  
1801 Pennsylvania Avenue, N.W.  
Washington, DC 20006

**Russell M. Blau**  
Counsel for MFS Communications  
Company, Inc.  
Swidler & Berlin, Chartered  
3000 K Street, N.W.  
Washington, DC 20007

**Paul Rodgers**  
General Counsel  
National Association of  
Regulatory Utility Commissioners  
1102 ICC Building  
P.O. Box 684  
Washington, DC 20044

**James Bradford Ramsay**  
Deputy Assistant General Counsel  
National Association of  
Regulatory Utility Commissioners  
1102 ICC Building  
P.O. Box 684  
Washington, DC 20044

**Richard S. Whitt**  
Counsel for Worldcom, Inc.  
d/b/a LDDS Worldcom  
Suite 400  
1120 Connecticut Avenue, N.W.  
Washington, DC 20036

**Loretta J. Garcia**  
Counsel for MCI Telecommunications  
Corporation  
1801 Pennsylvania Avenue, N.W.  
Washington, DC 20006

**Andrew D. Lipman**  
Counsel for MFS Communications  
Company, Inc.  
Swidler & Berlin, Chartered  
3000 K Street, N.W.  
Washington, DC 20007

**Roger W. Steiner**  
Assistant General Counsel  
Missouri Public Service  
Commission  
P.O. Box 360  
Jefferson City, MO 65102

**Charles D. Gray**  
Assistant General Counsel  
National Association of  
Regulatory Utility Commissioners  
1102 ICC Building  
P.O. Box 684  
Washington, DC 20044

**Daniel L. Brenner**  
Counsel for the National Cable  
Television Association, Inc.  
1724 Massachusetts Avenue, N.W.  
Washington, DC 20036

**Neal M. Goldberg**  
Counsel for the National Cable  
Television Association, Inc.  
1724 Massachusetts Avenue, N.W.  
Washington, DC 20036

**James R. Hobson**  
Counsel for National Emergency  
Number Association  
Donelan, Cleary, Wood & Maser, P.C.  
Suite 750  
1100 New York Avenue, N.W.  
Washington, DC 20005-3934

**David Cosson**  
Counsel for National Telephone  
Cooperative Association  
2626 Pennsylvania Avenue, N.W.  
Washington, DC 20037

**John H. Levy**  
Counsel for the National Wireless  
Resellers Association  
Cohn and Marks  
Suite 600  
1333 New Hampshire Avenue, N.W.  
Washington, DC 20036

**Mary E. Burgess**  
Of Counsel  
New York State Department  
of Public Service  
Three Empire State Plaza  
Albany, NY 12223

**Lawrence R. Krevor**  
Director - Government Affairs  
Nextel Communications, Inc.  
Suite 1001  
800 Connecticut Avenue, N.W.  
Washington, DC 20006

**David L. Nicoll**  
Counsel for the National Cable  
Television Association, Inc.  
1724 Massachusetts Avenue, N.W.  
Washington, DC 20036

**Richard A. Askoff**  
Counsel for National Exchange Carrier  
Association, Inc.  
100 South Jefferson Road  
Whippany, NJ 07981

**L. Marie Guillory**  
Counsel for National Telephone  
Cooperative Association  
2626 Pennsylvania Avenue, N.W.  
Washington, DC 20037

**Maureen O. Helmer**  
General Counsel  
New York State Department  
of Public Service  
Three Empire State Plaza  
Albany, NY 12223

**Robert S. Foosaner**  
Senior Vice President  
Government Affairs  
Nextel Communications, Inc.  
Suite 1001  
800 Connecticut Avenue, N.W.  
Washington, DC 20006

**Laura L. Holloway**  
General Attorney  
Nextel Communications, Inc.  
Suite 1001  
800 Connecticut Avenue, N.W.  
Washington, DC 20006

**Maureen Thompson**  
Counsel for NYNEX Telephone  
Companies  
1095 Avenue of Americas  
New York, NY 10036

**Richard A. Muscat**  
Assistant Attorney General  
State of Texas  
Counsel for TX-ACSEC  
Consumer Protection Division  
Public Agency Representation Section  
P.O. Box 12548, Capitol Station  
Austin, TX 78711-2548

**Mark J. O'Connor**  
Counsel for Omnipoint Corporation  
Piper & Marbury L.L.P.  
7th Floor  
1200 19th Street, N.W.  
Washington, DC 20036

**Lisa M. Zaina**  
General Counsel  
OPASTCO  
Suite 700  
21 Dupont Circle, N.W.  
Washington, DC 20036

**Lucie M. Mates**  
Counsel for Pacific Bell  
Room 1526  
140 New Montgomery Street  
San Francisco, CA 94105

**Theresa L. Cabral**  
Counsel for Pacific Bell  
Room 1526  
140 New Montgomery Street  
San Francisco, CA 94105

**Sarah Rubenstein**  
Counsel for Pacific Bell  
Room 1526  
140 New Montgomery Street  
San Francisco, CA 94105

**James L. Wurtz**  
Counsel for Pacific Bell  
1275 Pennsylvania Avenue, N.W.  
Washington, DC 20004

**Margaret E. Garber**  
Counsel for Pacific Bell  
1275 Pennsylvania Avenue, N.W.  
Washington, DC 20004

**Judith St. Ledger-Roty**  
Counsel for Paging Network, Inc.  
Reed Smith Shaw & McClay  
Suite 1100 East Tower  
One Franklin Square  
Washington, DC 20005

**John W. Hunter**  
Counsel for Paging Network, Inc.  
Reed Smith Shaw & McClay  
Suite 1100 East Tower  
One Franklin Square  
Washington, DC 20005

**William L. Roughton, Jr.**  
Counsel for PCS PrimeCo, L.P.  
Suite 850  
1133 20th Street, N.W.  
Washington, DC 20036



**Mark J. Golden**  
**Vice President of Industry Affairs**  
**Personal Communications Industry**  
**Association**  
**Suite 1100**  
**1019 19th Street, N.W.**  
**Washington, DC 20036**

**Jeffrey S. Kinder**  
**Counsel for Personal Communications**  
**Industry Association**  
**Wiley, Rein & Fielding**  
**1776 K Street, N.W.**  
**Washington, DC 20006**

**Duane W. Luckey**  
**Assistant Attorney General**  
**Section Chief**  
**Public Utilities Section**  
**Public Utilities Commission**  
**of Ohio**  
**180 E. Broad Street**  
**Columbus, OH 43215-3793**

**Peter Arth, Jr.**  
**Counsel for the Public Utilities**  
**Commission of the State**  
**of California**  
**505 Van Ness Avenue**  
**San Francisco, CA 94102**

**Ellen S. Levine**  
**Counsel for the Public Utilities**  
**Commission of the State**  
**of California**  
**505 Van Ness Avenue**  
**San Francisco, CA 94102**

**Robert W. Gee**  
**Commissioner**  
**Public Utility Commission of Texas**  
**7800 Shoal Creek Boulevard**  
**Austin, TX 78757**

**R. Michael Senkowski**  
**Counsel for Personal Communications**  
**Industry Association**  
**Wiley, Rein & Fielding**  
**1776 K Street, N.W.**  
**Washington, DC 20006**

**Stephen J. Rosen**  
**Counsel for Personal Communications**  
**Industry Association**  
**Wiley, Rein & Fielding**  
**1776 K Street, N.W.**  
**Washington, DC 20006**

**Ann E. Henkener**  
**Assistant Attorney General**  
**Public Utilities Section**  
**Public Utilities Commission**  
**of Ohio**  
**180 E. Broad Street**  
**Columbus, OH 43215-3793**

**Edward W. O'Neill**  
**Counsel for the Public Utilities**  
**Commission of the State**  
**of California**  
**505 Van Ness Avenue**  
**San Francisco, CA 94102**

**Pat Wood III**  
**Chairman**  
**Public Utility Commission of Texas**  
**7800 Shoal Creek Boulevard**  
**Austin, TX 78757**

**Judy Walsh**  
**Commissioner**  
**Public Utility Commission of Texas**  
**7800 Shoal Creek Boulevard**  
**Austin, TX 78757**

**Robert M. Lynch**  
Counsel for SBC Communications Inc.  
Room 1262  
175 E. Houston  
San Antonio, TX 78205

**J. Paul Walters, Jr.**  
Counsel for SBC Communications Inc.  
Room 1262  
175 E. Houston  
San Antonio, TX 78205

**Susan Drombetta**  
Manager - Rates and Tariffs  
Scherers Communications Group, Inc.  
575 Scherers Court  
Worthington, OH 43085

**Norina T. Moy**  
Counsel for Sprint Corporation  
Suite 1110  
1850 M Street, N.W.  
Washington, DC 20036

**Margot Smiley Humphrey**  
Counsel for TDS Telecommunications  
Corp.  
Koteen & Naftalin  
Suite 1000  
1150 Connecticut Avenue, N.W.  
Washington, DC 20036

**Kevin S. DiLallo**  
Counsel for the Telecommunications  
Resellers Association  
Hunter & Mow, P.C.  
Suite 701  
1620 I Street, N.W.  
Washington, DC 20006

**Victoria A. Schlesinger**  
Regulatory Attorney  
Telemation International, Inc.  
6707 Democracy Boulevard  
Bethesda, MD 20817

**Mary W. Marks**  
Counsel for SBC Communications Inc.  
Room 1262  
175 E. Houston  
San Antonio, TX 78205

**Gordon F. Scherer**  
President and Chief Executive Officer  
Scherers Communications Group, Inc.  
575 Scherers Court  
Worthington, OH 43085

**Jay C. Keithley**  
Counsel for Sprint Corporation  
Suite 1110  
1850 M Street, N.W.  
Washington, DC 20036

**Kent Y. Nakamura**  
Counsel for Sprint Corporation  
Suite 1110  
1850 M Street, N.W.  
Washington, DC 20036

**Charles C. Hunter**  
Counsel for the Telecommunications  
Resellers Association  
Hunter & Mow, P.C.  
Suite 701  
1620 I Street, N.W.  
Washington, DC 20006

**Gregory M. Casey**  
Senior Vice President, Regulatory  
& Telephone Company Relations  
Telemation International, Inc.  
6707 Democracy Boulevard  
Bethesda, MD 20817

**J. Manning Lee**  
Vice President, Regulatory Affairs  
Teleport Communications Group Inc.  
Suite 300  
Two Teleport Drive  
Staten Island, NY 10311

**Gail Garfield Schwartz**  
Vice President, Public Policy and  
Government Affairs  
Teleport Communications Group Inc.  
Suite 300  
Two Teleport Drive  
Staten Island, NY 10311

**Glenn S. Richards**  
Counsel for Teleservices Industry  
Association  
Fisher Wayland Cooper Leader &  
Zaragoza L.L.P.  
Suite 400  
2001 Pennsylvania Avenue, N.W.  
Washington, DC 20006

**Sue D. Blumenfeld**  
Counsel for Time Warner  
Communications Holdings, Inc.  
Willkie Farr & Gallagher  
Three Lafayette Centre  
1155 21st Street, N.W.  
Washington, DC 20036

**Mary McDermott**  
U.S. Telephone Association  
Suite 600  
1401 H Street, N.W.  
Washington, DC 20005

**Charles D. Cosson**  
U.S. Telephone Association  
Suite 600  
1401 H Street, N.W.  
Washington, DC 20005

**Jeffrey H. Olson**  
Counsel to U.S. AirWaves Inc.  
Paul, Weiss, Rifkind,  
Wharton & Garrison  
Suite 1300  
1615 L Street, N.W.  
Washington, DC 20036

**Kenneth A. Shulman**  
Senior Vice President, Technology  
Teleport Communications Group Inc.  
Two Teleport Drive, Suite 300  
Staten Island, NY 10311

**Brian Conboy**  
Counsel for Time Warner  
Communications Holdings, Inc.  
Willkie Farr & Gallagher  
Three Lafayette Centre  
1155 21st Street, N.W.  
Washington, DC 20036

**Thomas Jones**  
Counsel for Time Warner  
Communications Holdings, Inc.  
Willkie Farr & Gallagher  
Three Lafayette Centre  
1155 21st Street, N.W.  
Washington, DC 20036

**Linda Kent**  
U.S. Telephone Association  
Suite 600  
1401 H Street, N.W.  
Washington, DC 20005

**Pamela Portin**  
Director of External Affairs  
U.S. AirWaves Inc.  
Suite 625  
10500 N.E. 8th Street  
Bellevue, WA 98004

**Stephen G. Kraskin**  
Counsel for U.S. Intelco Networks, Inc.  
Kraskin & Lesse  
Suite 520  
2120 L Street, N.W.  
Washington, DC 20037

Thomas J. Moorman  
Counsel for U.S. Intelco Networks, Inc.  
Kraskin & Lesse  
Suite 520  
2120 L Street, N.W.  
Washington, DC 20037


Jeffrey S. Bork  
Counsel for U S WEST, Inc.  
Suite 700  
1020 19th Street, N.W.  
Washington, DC 20036

Melanie Haratunian  
Counsel for The Yellow Pages  
Publishers Association  
Halprin, Temple, Goodman & Sugrue  
Suite 650, East Tower  
1100 New York Avenue, N.W.  
Washington, DC 20005

Dan L. Poole  
Counsel for U S WEST, Inc.  
Suite 700  
1020 19th Street, N.W.  
Washington, DC 20036

Albert Halprin  
Counsel for The Yellow Pages  
Publishers Association  
Halprin, Temple, Goodman & Sugrue  
Suite 650, East Tower  
1100 New York Avenue, N.W.  
Washington, DC 20005

121717



Yvette Omar